



# Status of $K_L \rightarrow \pi^0 \gamma \gamma$

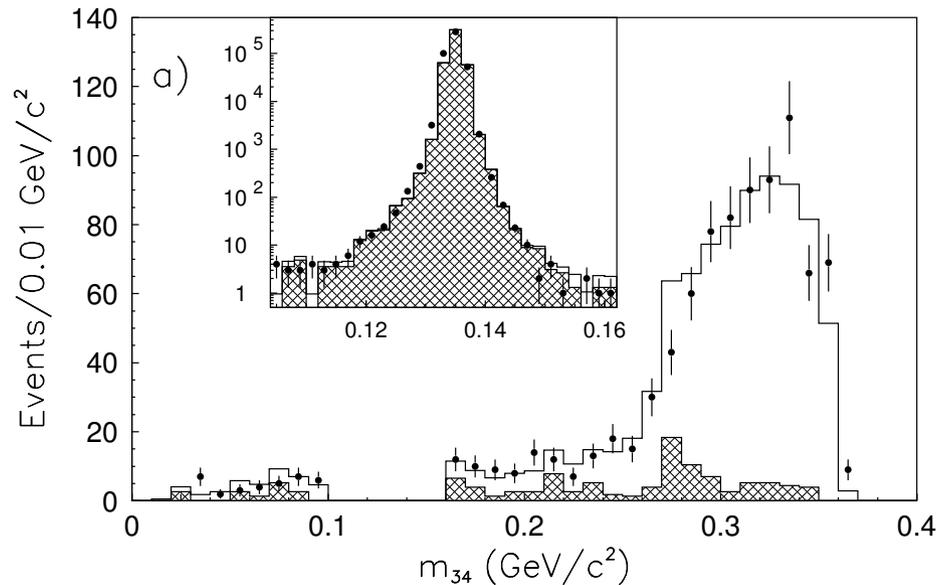
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- Background Studies
- $\pi^0$  Mass
- Things to do



# Background in Published Result

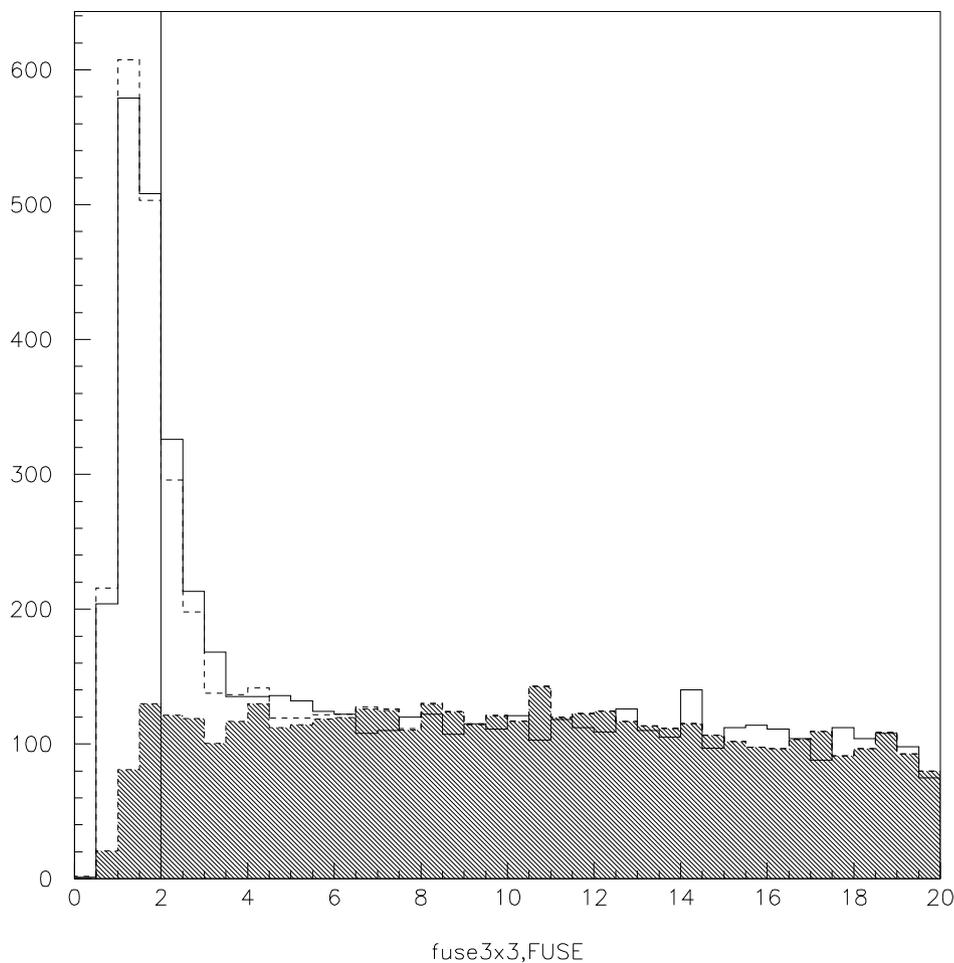


- Published result.
- Estimated background  $\sim 13\%$ .
  - Used online calibration.
  - Used fusion  $\chi^2$  to estimate bkg.



# Background Estimate

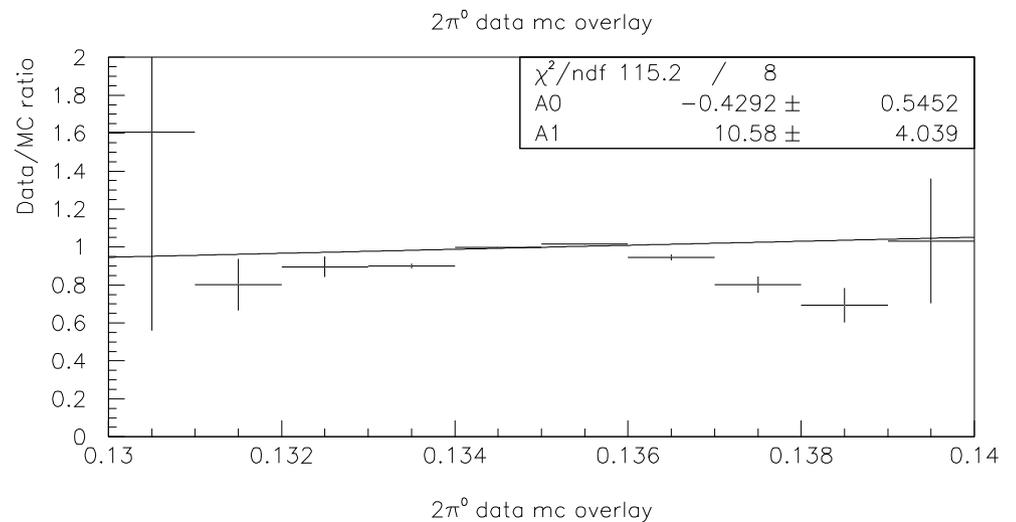
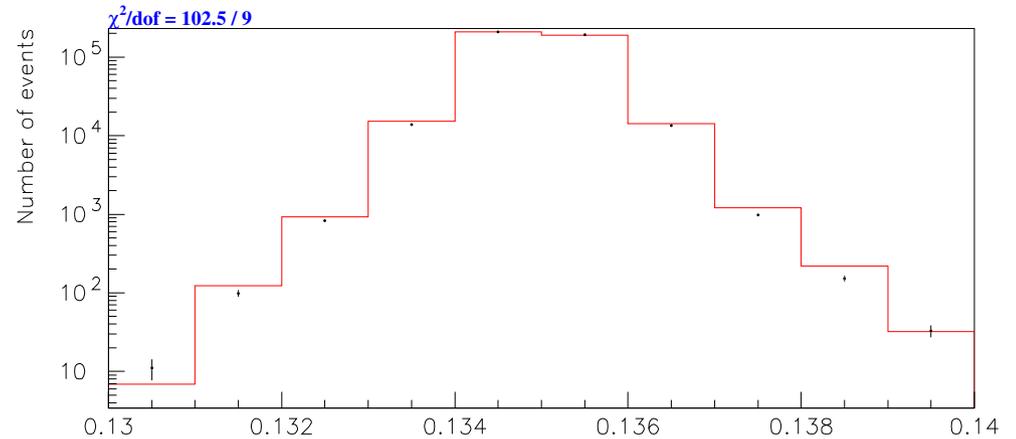
- Fusion  $\chi^2$  distribution.
  - Cut Fuse3x3  $< 2$ .
  - $3\pi^0$  background level estimated from Fuse3x3  $> 5$ .
  - Extrapolate  $3\pi^0$  MC into signal region.





# $\pi^0$ Mass Distribution.

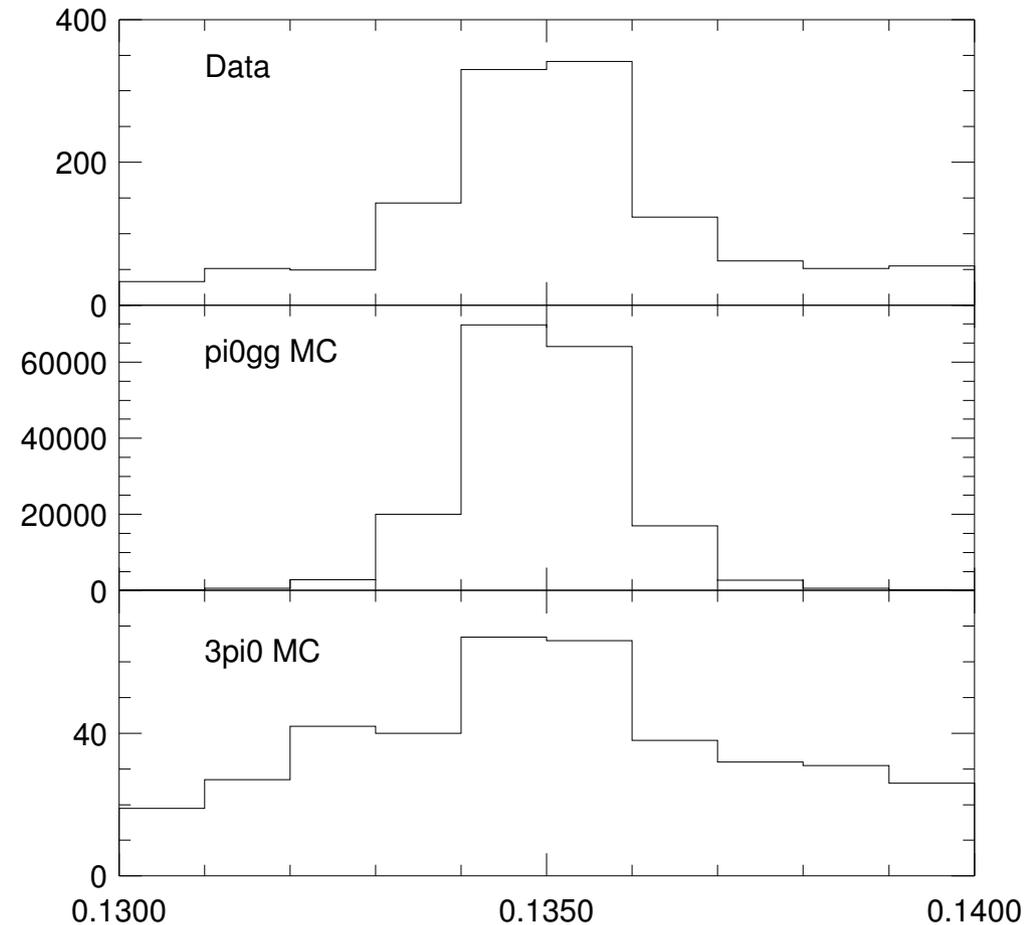
- Try  $\pi^0$  mass to estimate background.
- $K_L \rightarrow \pi^0 \pi^0$  events well-matched by MC.
- Tight cuts in crunch.
  - $\rightarrow$  redo crunch.
  - 99 data only.





# Alternate technique

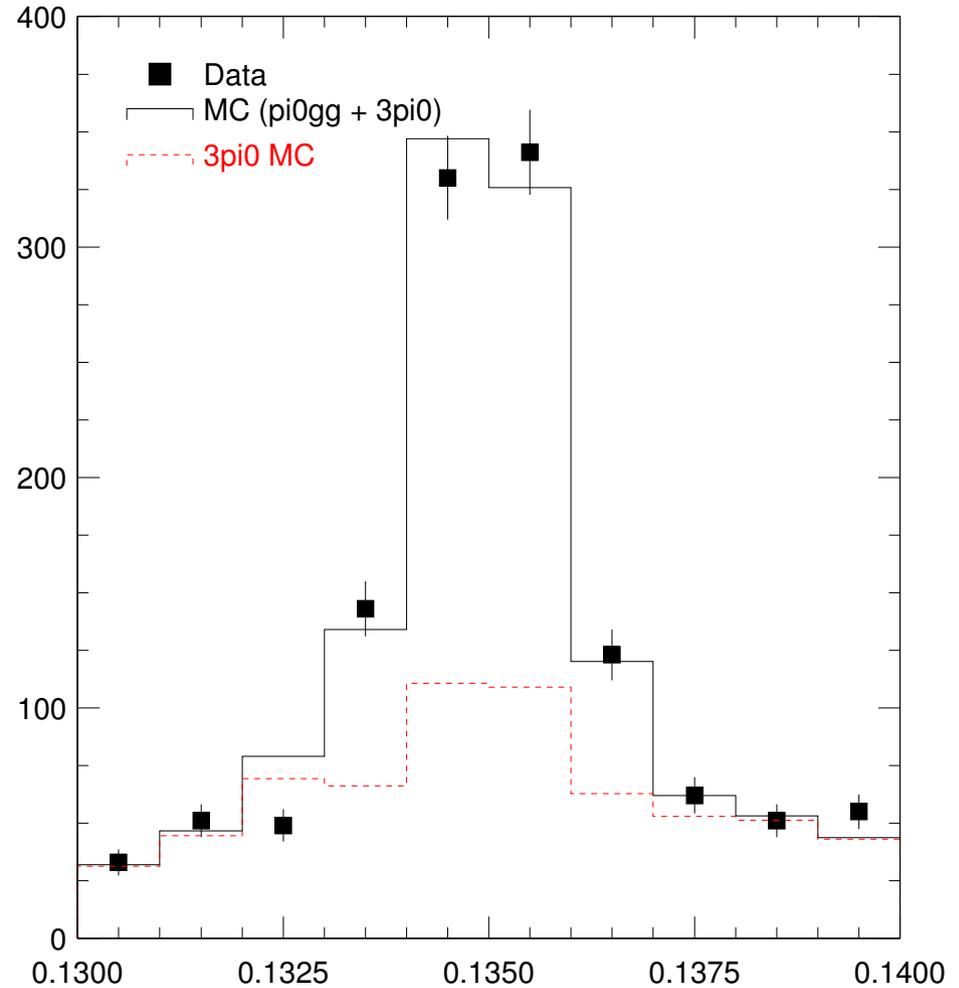
- Fit data to two shapes.
  - $K_L \rightarrow \pi^0 \gamma \gamma$  MC.
  - $K_L \rightarrow \pi^0 \pi^0 \pi^0$  MC.
- Background evident in tails of  $\gamma \gamma$  mass distribution.





# Fit results

- Fit seems to be good.
  - Bad news:  
Background is closer to 40%!





# Things to do

- Finish crunching 96 and 97 data.
- Redo all fits.
- Look at reducing background.
- Try to reconcile old and new background estimates.